UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

OFFICE OF THE
INSPECTOR GENERAL

September 21, 2010

Concur: Case Closed

MEMORANDUM TO: Joseph A. McMillan
                   Assistant Inspector General
                   for Investigations

THRU:

(b)(7)(C)

FROM:

SUBJECT: INAPPROPRIATE USE BY NRC OF RIERA MODEL OF
             AIRCRAFT IMPACT FOR NEW REACTORS
             (OIG CASE NO. 08-14)

Proactive Initiative

The Office of the Inspector General (OIG), U.S. Nuclear Regulatory Commission (NRC), initiated this investigation based on a proactive office initiative to identify instances where it appeared that NRC might not have followed agency processes regarding significant regulatory matters. At the time this investigation was initiated, the NRC was considering whether the Riera methodology was an appropriate tool for new reactor applicants to use to assess the potential effects of the impact of a large commercial aircraft on new nuclear power plants. OIG reviewed whether or not the NRC followed established procedures and processes regarding the appropriateness of using the Riera methodology for aircraft impact analysis.

Additionally, during the investigation, OIG identified information that suggested NRC may have inappropriately released information to licensees by providing them with data that could be reverse engineered using calculations from the Riera methodology to reveal classified information. Therefore, OIG reviewed whether or not the NRC appropriately handled Riera-related information in accordance with the NRC information security process.

Findings

OIG found that the NRC is currently preparing guidance (i.e., regulatory guide) for new reactor applicants informing them they may use the Riera methodology or any other viable methodology in the preparation of their application documents, but this guidance has not yet been issued. OIG also found that the NRC followed its information security process regarding Riera-related data and no improper release of classified information occurred.

Basis of Findings

Selection of Riera Methodology

OIG learned that the Riera methodology is one of several techniques for evaluating aircraft impacts on solid structures used by scientists and engineers in government, academia, and the private sector. The Riera methodology, also referred to as a force time-history analysis method, evaluates the response or collapse of the target structure using the characteristics of both the impacting aircraft and target structure. Applicants for new nuclear reactor operating licenses are required by 10 Code of Federal Regulations (CFR) 50.150(a) to conduct a beyond design basis aircraft impact assessment for the proposed facility. OIG also learned that the Riera methodology is currently used by the U.S. Department of Energy to evaluate aircraft impacts on its nuclear and other hazardous facilities.

As of this date, the regulatory guide associated with Riera (DG-1176, "Guidance for the Assessment of Beyond Design Basis Aircraft Impacts") is a draft document. When approved, this document will become Regulatory Guide 1.217. The draft regulatory guide endorses Nuclear Energy Institute (NEI) document 07-13, "Methodology for Performing Aircraft Impact Assessments for New Plant Designs," as an acceptable method for satisfying the NRC's requirements regarding the assessment of aircraft impacts for new nuclear power plants.

NEI 07-13 enumerates two methodologies, "force time-history analysis method" (Riera) and "missile-target interaction analysis method," that can be used for evaluating aircraft impact on nuclear power plant structures that house nuclear fuel (i.e., containment and spent fuel pool). In addition, the draft regulatory guide includes the following statement:

> Licensees or applicants may use methods other than those provided in NEI 07-13, Revision 7, to meet the requirements of 10 CFR 50.150(a). The staff will review such methods and determine their acceptability on a case-by-case basis.

OIG interviewed Syed Ali, Senior Technical Advisor, and Richard P. Croteau, Deputy Director, both from the Division of Engineering, Office of Nuclear Regulatory Research. Both stated that the Riera methodology for evaluating aircraft impacts on nuclear plant structures is only one piece of the overall security treatment of aircraft impacts. Ali stated that while there are limitations in the use of the Riera methodology, NRC addressed these limitations by increasing the NRC provided force time-history curve by a factor of 20 percent to account for the limitations and uncertainties.

OIG interviewed (b)(7)(C) Sandia National Laboratories, who stated that using a simplistic approach like the Riera model could be advantageous because it allows licensees to accomplish analyses within their capabilities, and Riera could do a reasonable job within certain parameters.

OIG interviewed (b)(7)(C)
(b)(7)(C) stated that Riera was adequate for the NRC's purposes because the staff was looking for "approximate answers" and was conducting a "very coarse" analysis of aircraft impact scenarios.

Security Concerns

The Riera methodology requires the generation of a force time-history curve to assess aircraft impact on a structure. The NRC determined that the input data used to generate the force time-history curve is classified. NRC also determined that the NRC generated force time-history curve is safeguards information. The force time-history curve is provided by the NRC to new nuclear power plant designers/evaluators who have established an NRC approved safeguards information program and a need to know.

Both Ali and (b)(7) said it was possible to reverse engineer the force time-history curve to compute the classified input data; however, they indicated that the reverse engineering process would yield not only the classified input data, but multiple combinations of potential input data, therefore, it would be difficult to discern the actual classified input data. In addition Ali stated that increasing the curve by a factor of 20 percent also increases the difficulty of discerning the classified input data.

Because OIG found that the NRC followed its processes in determining that the Riera methodology is an acceptable method to evaluate aircraft impacts on new nuclear power plant structures, and that the NRC did not release classified information related to the Riera methodology, it is recommended that this investigation be closed to the files of this office.